

Patent Claims

1. A method for checking for line faults in a bus system (1) which has at least two bus subscribers (2 - 5) which are connected for the purpose of data communication with one another to a data bus (6) which has at least two bus lines (7, 8), with the bus subscribers (2-5) being able to assume a recessive state and a dominant state, and with an internal high potential (VCC, VCC2) and an internal low potential (GND, GND2) being available in the bus subscribers,
 - with the check for a line fault being carried out by the bus subscriber (2) which is in the dominant state, and
 - with the check for line faults being carried out by comparison of voltage levels (VCANH, VCANL) on the bus lines (7, 8) with threshold values (Vref1, Vref3) which are related to the internal high level (VCC2) or to the internal low level (GND2) of the bus subscriber (2).
2. The method as claimed in claim 1, in which a supply voltage (VCC) which is related to the internal reference ground potential is provided in the bus subscribers, with the threshold values (Vref1, Vref3) being greater than this supply voltage (VCC), and a fault being identified when one of the voltage levels (VCANH, VCANL) on the bus lines (7, 8) is greater than the respective threshold value (Vref1, Vref3).
3. The method as claimed in claim 2, in which a fault is identified when one of the voltage levels (VCANH, VCANL) on the bus lines (7, 8) is greater than the respective threshold value (Vref1, Vref3) during a predetermined number of successive

dominant states of the bus subscriber which is carrying out the fault identification.

4. The method as claimed in one of claims 1 to 3, in which the voltage levels (VCANH, VCANL) on the data lines (7, 8) are compared with one another for detection of transmitted data, in which case, on detection of a fault on one of the lines (7; 8), detection of transmitted data is carried out by means of a comparison of the voltage level (VCANL; VCANH) on the other line (8; 7) with a threshold value (Vref4; Vref2) which is related to the internal high potential or the internal low potential.
5. A bus system (1) for serial data transfer of binary data between at least two bus subscribers (2 - 5) which are coupled for the purpose of data communication with one another to a data bus (6) which contains at least two bus lines (7, 8), with a bus subscriber (2 - 5) having:
 - at least one control unit (2b - 5b),
 - at least one transceiver (2a - 5a) for transmission and/or reception of data signals (CANL, CANH), and
 - at least one device for fault identification for carrying out one of the methods mentioned above.
6. The bus system as claimed in claim 5, which, for fault detection, has at least one fault detection means for comparison of at least one voltage level (VCANH; VCANL) on one of the bus lines (7, 8) with a threshold value (Vref1, Vref3) which is related to the internal low level (GND2) or to the internal high level (VCC2), and for provision of a fault signal (32, 35).
7. The bus system as claimed in claim 6, which has:

- a first fault detection means (22) for comparison of the voltage level (VCANH) on one (7) of the data lines with a first threshold value (Vref1), and for provision of a first fault signal (32), and
 - a second fault detection means (23) for comparison of the voltage level (VCANL) on the other (8) of the data lines with a second threshold value (Vref3), and for provision of a second fault signal (33).
8. The bus system as claimed in claim 6 or 7, which, for detection of transmitted data, has a first data detection means (21) for comparison of the voltage levels (VCANH, VCANL) on the bus lines (7, 8), with the first data detection means providing a first data signal (31).
9. The bus system as claimed in claim 8, which has the following further features:
- for detection of transmitted data, at least one second data detection means (24, 25) which compares the voltage level (VCANH, VCANL) on at least one of the data lines (7, 8) with at least one threshold value (Vref2, Vref4) which is related to the internal low level (GND2), in order to provide at least one second data signal (34, 35), and
 - switching means (26) for switching between the one data signal (31) and the at least one second data signal (33, 34) as a function of the at least one fault signal (32, 33).
10. The bus system as claimed in one of claims 5 to 9, characterized

in that the data bus (6) is designed for serial transmission of binary data by means of duplex signals (CANL, CANH) and, for this purpose, is in the form of a differential, two-wire data bus (6) whose two bus lines (7, 8) are twisted with one another.

11. The bus system as claimed in one of claims 5 to 10, characterized in that the bus system (1) is in the form of a CAN bus system.